1 Optical Storage

lesson One

A Dialogue

Answers

1 laser beam
spiral
interesting

2 answers vary

lesson Three

C Vocablary

Answers

b / c / a / f / e / d

lesson Four

D Properties and uses

Answers

1 a / **2** b / **3** c / **4** a / **5** a

lesson Five

E Grammar

Answers

2 Sentence (**a**) means that he is still in the factory.
Sentence (**b**) means that he stayed in the factory for 20 minutes then he left.

3 Sentence (**a**) means that as soon as the customer arrived they discussed the needed qualities with him
Sentence (**b**) means that they had already discussed the needed qualities before the customer arrived.

4 Sentence (**a**) means that as a result of his promise they received 1000SYP
Sentence (**b**) means that they had already received 1000 SYP although he promised to give 2000 SYP.

lesson Six

F Reading

Answers

1 (They) refers to CDs and DVDs / (This) refers to recording data / (it) refers to a CD-RW or a DVD-RAM

2 The advantages of optical storage devices are:
storing digital data
They are portable and easy to store

They are cheap to produce
data can be accessed quickly
easy to pinpoint a particular piece of data that had been recorded on the disk

3 He must have good problem-solving skills and excellent communication skills

4 Answers vary.

Activity book Answer keys

Unit 1, Page 3, Exercise 1

a optical storage
b CD
c digital
d bumps
e laser beam
f information
g player

Unit 1, Page 4, Exercise 2

1 c / **2** d / **3** e / **4** a / **5** b

Unit 1, Page 4, Exercise 3

1 Did you forget to call the technician yesterday?
2 She has already phoned the manager, so you don't have to speak to him
3 Does a CD take plenty of time to be recorded?
4 He is using modern equipment to make thousands of DVDs in a very short period of time, isn't he? / He isn't using modern equipment to make thousands of DVDs in a very short period of time, is he?
5 When the customer cancelled his order, the factory had already finished manufacturing the CDs. / The factory had finished manufacturing the CDs when the customer cancelled his order.
6 The employees were having lunch when the package arrived.

Unit 1, Page 4, Exercise 4

1 Both the DVD R and the DVD-RW have a capacity of 4.7 Gb.
2 The benefit of the DVD-RW is that it can be written many times, which means that it can be used for recording more than once.
3 The disadvantage of the DVD-RDL is that it's more expensive than the standard DVD-R and DVD_RW.
4 **a** to write many times.
b dual
c impressive (impressed)
d expensive

2 Digital Cameras

lesson One

A Dialogue

Answers

1 Conventional cameras depend entirely on chemical and mechanical processes, they don't need electricity to operate on them.
Digital cameras have a built-in computer and record digital images electronically.
2 Provide
Bits and bytes
Tiny
Image
Replace
3 Digital photographs can be sent by email since the digital camera is represented in the language that computers recognize.
4 Answers vary.

lesson Three

C Vocablary

Answers

1 d / **2** e / **3** f / **4** b / **5** a / **6** g / **7** c

lesson Four

D Grammar

Answers

1 will take, buy
2 fix, will be
3 installs, will know
4 set, will check
5 break, will stop.

lesson Five

E Reading

6

Answers

a trafffic lights
b red-light camera
c computer
d second trigger
e first trigger
f sensor loop

7

Answers

1 It consists of four cameras, two triggers and a computer

2 The cameras are positioned on tall poles at the four corners of an intersection and point inwards towards the center.

3 A trigger is a length of wire laid out in two rectangular coils (called sensor loops) buried under the ground near the stop line.

4 As soon as a car crosses a trigger, it changes the magnetic field around the wire loops the computer recognizes that the magnetic field has changed and knows that a car has passed over the trigger.

5 If a car activates both triggers one after the other, the computer will recognize that a car has moved into the intersection.

6 A computer is used to calculate the distance between the two locations.

Activity book Answer keys

Unit 2, Page 6, Exercise 1

1 pixel
2 electronically
3 lens
4 bits and bytes
5 semiconductor

Unit 2, Page 6, Exercise 2

1 **b** speed gun... **a** speed limit
2 **b** laser beam... **a** laser transmitter
3 **b** speedometer... **a** Telescopic sight

Unit 2, Page 7, Exercise 3

1 **a** will take
2 **a** As soon as
3 **a** will work
4 **a** will have, before
5 **a** use

Unit 2, Page 7, Exercise 4

1 synonyms:
rub = wipe, blow away = remove
antonyms:
front = back, up = down, outside = inside
2 Because blowing the dust away is enough to clean the sensor
3 It should be cleaned by blower brush to clean the outside to prevent dirt on the outside to make its way inside.

Unit 2, Page 8, Exercise 5

1 Focus
2 Zoom lenses
3 Image stabilization
4 Exposure modes
5 Face detection
6 Shooting modes

3 Power supply

lesson One

A Dialogue

Answers

(where) refers to the laboratory
(which) refers to the diodes
(where) refers to the last stage
(that) refers to building a CD power supply.

lesson Three

C Vocablary

Answers

1 efficient
2 switching
3 outlet
4 voltage
5 specification
6 input
7 output
8 estimated

lesson Four

D Grammar

Answers

1 A switch-mode power supply, which is used to power PCs and TVs, is a very efficient power supply.
2 A CD power supply had three important main components, which are the rectifier, the capacitor and the regulator.
3 The lab technician, whose purpose is to teach students how to build a DC power supply, is showing them around the lab.
4 The power flow in a DC power supply is controlled by a capacitor, which is a part that keeps the power supply from surging.

lesson Five

E Reading

Answers

1 Suggested titles:
Making an AC Power Supply
AC Power Supply Setup
2 Soldering: joining metal surfaces together using melted metal.

Voltage: the force of electric current measured in volts.
Capacitor: a piece of equipment that collects and stores electricity.
Resistor: A piece of wire or other material used for increasing electrical resistance.

3 solder, attach

4 Answers vary.

Activity book Answer keys

Unit 3, Page 9, Exercise 1

1 There are three main stages for converting AC to DC power

2 The rectification stage is when a rectifier converts AC to DC

3 The diodes in the rectifier allow electricity to pass one way and not the other

4 The smoothing stage is when a capacitor regulates the amount of electricity to the required level

5 The regulation stage is when regulator provides constant and regular output of power.

Unit 3, Page 9, Exercise 2

1 that which

2 where

3 who

4 whose

Unit 3, Page 10, Exercise 3

1 Suggested titles:
Building an Efficient Power Supply
A Power Supply that Prevents Energy Loss
A well-Designed Power Supply
d-The Importance of Well-Designed Power Supply
Answers vary

2 **a** True
b True
c False
d False

3 The factors are: size, weigh, percentage of energy loss, quality of semi conductors

4 The design of power supply is important for both the environment and the user because it prevents energy loss

Review (Unit 1 – 3)

A

1 b
2 e
3 d
4 c
5 f
6 a
7 h
8 g

B

Power supply	Optical storage	Digital cameras
Voltage	spindle	Magnetic field
Capacitor	Disc	Laser transmitter
Resistor	Spiral track	Traffic lights
current	DVD R	Sensor loop
DC	optical	Trigger
Rectification	record	pixels

C

1 storage / **2** store / **3** capacities / **4** drives / **5** DVDs / **6** space / **7** damaged.

D

1 effeciency
2 digital
3 electric
4 conventional
5 important.

E

The correct arrangement of the sentences is:
4, 5, 6, 2, 1, 3

F

1 visits
2 are
3 is demonstrating
4 was recording
5 has been

G

Answers vary.

H

1 Efficiency in a power supply, which is based on the size, design and material, is a major concern.
2 Traffic is very well controlled in the streets of this city where red-light cameras are installed.
3 Dr Jill whom I met last week, will teach Physics.
4 Mr. Samer who is a competent teacher, explained all the possible ways of storing digital data.

Test 1 Answer Key

Page 12, Part one, Exercise I

1 The features are: overcurrent, over temperature, overvoltage, soft start, power factor correction and electromagnetic compatibility.
2 It's important for power supplies to have the mentioned features to protect them.
3 The temperature sensor protects the power supply by disabling the supply if the temperature goes above the specific value.
4 require: need
exceed: to be more than a particular number or amount
disables: stops
critical: very important

Page 12, Part two, Exercise II

1 power supply
2 input voltage
3 output voltage
4 electrical energy
5 circuits
6 electromagnetic induction
7 magnetic field.
8 coils

Page 13, Part two, Exercise III
Answers vary.

Page 13, Part two, Exercise IV
1 had studied
2 finished
3 was living
4 received
5 is working
6 will travel

Page 13, Part two, Exercise V
1 Alan, who didn't come to class yesterday, explained his absence to the teacher.
2 Jack, who speaks Russian, applied for the job.
3 We enjoyed the city where we spent our vacation.
4 We enjoyed Damascus, where we spent our vacation.
5 The elephants, which we saw at the zoo, had only one tusk.

4 Sensors

lesson One

A Dialogue

Answers

1 (it) refers to: either two or four sensors
(that) refers to the part of the bumper
(they) refers to the sensors.
2 No, he didn't because he needs to check the length of the bumpers in the car.
3 The installation of the car sensors is delicate because they have to work accurately to detect objects behind the car and should be done by a specialist.

lesson Three

C Vocablary

3

Answers

1 revers / **2** facing / **3** installed / **4** accurate / **5** bumper / **6** sensors

5

Answers

1 to do / **2** were made / **3** did / **4** was made / **5** done / **6** made

lesson Four

D Grammar

6

Answers

2 Safety hats should be worn in the garage.
3 This invoice has to be paid before the end of the month.
4 The damaged car could be seen.
5 The sensors must be repaired at once.
6 The damaged part of the sensor should be thrown away.
7 The car sensors will be repaired within a week.
8 Those four containers must be sent by rail.

7

Answers

2 (Passive)
3 (active)
4 (Active)
5 (Passive)

lesson Five

E Rreading

8

Answers

Touch sensor: Column A humidity sensor: Column B Ultrasonic sensor: Column C temperature sensor: Column D				
Characteristics	**A**	**B**	**C**	**D**
a detects the presence of moisture		✔		
b measures temperature				✔
c detects physical contact	✔			
d uses sound waves and echolocation			✔	
e responds to touch	✔			
f can be found in heating and cooling systems				✔
g can be found in devices like smartphones	✔			

9

Answers

1 Students' answers

2 (they) line 7, refers to touch sensors
(they) line 13, refers to Ultrasonic sensors
(they) line 19, refers to sensors.

3 Answers vary.

Activity book Answer keys

Unit 4, Page 14, Exercise 1

1 sensor / **2** parking / **3** installed / **4** bumper

Unit 4, Page 15, Exercise 2

Answers vary

Unit 4, Page 15, Exercise 3

A

1 two or four sensors are installed on the car's bumper.
2 Yesterday, my car sensors were repaired due to the road accident.
3 This weekend my car will be checked by a mechanic.
4 Sensors are installed according to the instruction manual.
5 In the future, much more advanced parking sensors will be manufactured.
6 Sensors are tested before driving to make sure that they have been installed correctly.

B

1 Connection should be tested and made sure the control box is working properly.
2 Before sensors are installed, a location has to be chosen for their replacement.
3 The car battery must be disconnected to prevent yourself from getting injured when sensors are installed.
4 A warning siren can be installed in the trunk to warn you if you're reversing too close to a car.

Unit 4, Page 16, Exercise 4

1 A contact temperature sensor and a noncontact temperature sensor.
2 A contact thermometer measures something that it touches
3 Non-contact thermometers are useful since they can measure something that is not close by as well as moving objects that are far away and difficult to reach.
4 **a** fever
b changes
c temperature
d large

Unit 4, Page 16, Exercise 5

Answers vary.

Unit 4, Page 16, Exercise 6

Answers vary.

5 Maintenance of Home Appliances

lesson One

A Dialogue

Answers

1 her washing machine
2 It's not running properly.
3 the lid is not closed tightly or the washing machine is overloaded
4 to put lighter loads and to wait around 15 minutes between loads for the motor to rest

lesson Two

B Listening

Answers

3 a / **4** b / **2** c / **6** d / **1** e / **5** f / **7** g Constantly use antivirus software to protect your computer.

lesson Three

C Vocablary

Answers

1 air conditioning
2 washing machine
3 dryer
4 oven
5 refrigerator
6 microwave
7 blender

lesson Four

D Grammar

Answers

1 Ahmed asked me if the maintenance employees were working efficiently.
2 Jason wanted to know who sent / had sent the laptop for maintenance.
3 Robert asked me if Tim was trying to fix the air conditioning.
4 Hind asked me if they would provide them with maintenance services the next day.
5 Rima wanted to know where we sent our home appliances to be repaired.
6 Nancy wanted to know why Nick didn't send / hadn't sent the broken TV back to the store.
7 Huda asked me where the best maintenance stores in town were.

8 Linda asked me if my mum flew / had flown to London two weeks ago.
9 A man asked me when the handyman arrived.

lesson Five

E Reading

Answers

1 No; they install and repair appliances; they drive to the location of the equipment; they show the customer how to use the appliance and answer questions about maintaining it; their knowledge and skills should be constantly updated regarding new models
2 in order to repair the latest appliances
3 **a** repair: fix
b installing: placing (equipement or machinery) in position ready for use
c maintaining: keep a machine in good condition or in working order by checking or repairing it regularly
d inspect: examine; check

lesson six

F Writing

Answers

student's answers

Activity book Answer keys

Unit 5, page 17, exercise 1
a (2 / 3 / 4 / 6 / 10); **b** (3 / 6 / 9 / 10); **c** (2 / 3 / 6 / 9 / 10); **d** (2 / 4 / 5 / 6 / 8 / 9 / 10); **e** (2 / 5 / 8 / 10); **f** (2 / 3 / 6 / 7 / 10); **g** (1 / 2 / 6 / 10); **h** (2 / 3 / 6 / 10);**i** (2 / 6 / 10); **j** (2 / 4 / 6 / 10);

Unit 5, page 17, exercise 2
Student's answers

Unit 5, page 18, exercise 3
1 Khaled wanted to know how he could learn about maintaining home appliances.
2 Ruba asked how to keep her appliances safe during thunderstorms.
3 The manager wanted to know who could take care of his broken TV.
4 Amer asked me if I could finish restoring his laptop by the next day.
5 Hani wanted to know if it was possible to identify the reason why the radio kept breaking down.

Unit 5, page 18, exercise 4

1 it: battery
I: Ali Gaafar
you: Telco Phone Co

2 physical barriers such as concrete walls

3 A

4 from a room where the signal cannot be received because the phone may not be able to transmit or receive a signal when obstructed by physical barriers

Unit 5, page 19, exercise 5

Student's answers

Unit 5, page 19, exercise 6

Student's answers

6 Installation of lifts & Escalators

lesson One

A Dialogue

Answers

1 He installs and repairs lifts.
2 His job is stable because it relies on maintenance and repair.
3 **a** They have different jobs.
b A lift installer's job relies on maintenance and repair.

lesson Two

B Listening

Answers

1 pump and reservoir
2 small family residences
3 compartment
4 cable
5 above the lift shaft

lesson Three

C Vocablary

Answers

1 **e** / **2** f / **3** a / **4** d / **5** b / **6** g / **7** c

lesson Four

D Grammar

Answers

4

2 I don't believe Tom has had much experience in installing escalators.
3 I don't propose we should look for a new employee who has more experience in repairing lifts.
4 I don't believe we could always ask for a different manager.
5 I don't expect they would agree to this in the middle of a critical state of sales.
6 I don't think they would understand our position.

5

2 Requesting. Mike asked Laila not to leave the escalators working after 6 p.m.
3 Advising. Susie advised Alice to take the lifts instead of the stairs. She thought that Alice would save some time and energy.
4 Reminding. Ali reminded Jane to press the alarm button if the lift suddenly stopped.
5 Warning. Huda warned Ali not to go down an ascending escalator.

6 Encouraging. Khaled encouraged me to install more escalators in the shopping centre.
7 Requesting. Samer asked Liz not to go into an overcrowded lift.

lesson Five

E Reading

Answers

1 technical fields: electronics, mechanics, computers
2 Lift installers should have a lot of knowledge and skills.
3 Students' answers
4 **a** requires **b** fluid **c** apprenticeship **d** properly

lesson Six

F Writing

Answers

Students' answers

Activity book Answer keys

Unit 6, page 20, exercise 1

1 a / **2** d / **3** b / **4** c / **5** a

Unit 6, pages 20-21, exercise 2

A

1 He does not think that this escalator is well installed.
2 I don't believe the public might be aware that the lifts are still out of service.
3 I don't expect that installing escalators will reduce the number of customers who will use the stairs.
4 I believe that even though we had the best experts on installing lifts, we would still face maintenance problems and complaints from customers.

B

1 advising
2 warning
3 encouraging
4 reminding
5 requesting

Unit 6, page 21, exercise 3

1 the role of control panels in the installation of a lift
2 a lift installer
3 The panel should provide the available choice the passenger can make; it should be able to allow the individual to signal his choice; it should be able to confirm the choice made with a certain type of feedback.
4 a device set with buttons that designate the floors that the cabin can stop at

Unit 6, page 22, exercise 4

Students' answers

Unit 6, page 22, exercise 5

Students' answers

Review (Unit 4 – 6)

A

1 b
2 g
3 j
4 a
5 e
6 i
7 c
8 f
9 h
10 d

B

Answers may vary

C

Home appliances	Sensors	Lifts and escalators	Words in common

D

1...the car won't start.
2...you can't see.
3...you've got a flat tyre.
4...it looks old and rusty.

E

1
2
3
4

F

1 False, very demanding
2 True
3 False, repairing and installing
4 True

G

Top floor, Lift shaft, Electronic hoist motor, Lift pit, Machine room, Hoist cable, Cabin

H

Answers may vary.

I

1 made
2 made
3 do
4 Doing
5 done

J

1 An appointment will be made by Salah to have his car serviced.
2 Water can't be put in the radiator when it is steaming.
3 Minor and major car services must be supervised by professional mechanics.
4 A racing car can be serviced by mechanics in less than ten seconds.

K

1 Active
2 Passive
3 Passive
4 Active
5 Active

L

1 The doctor advised the patient to eat healthy food and exercise daily.(action)
2 Their teacher reminded them to study well for the test. (action)
3 The teacher told the students that they had to go over the information several times. (information)
4 Nora told the teacher that she would like to use the dictionary during the test. (information)
5 The repairman warned the lady not to touch anything because she might damage the microwave. (action)

M

Answers may vary

Sample Test 2 Answer Key

Page 23, Part one, Exercise I

1 **a** The benefits and types of Car Sensor Systems.
b Tasks of an Electrical Automotive Engineers.
c Answers vary

2 (their) refers to electrical automotive engineers
(they) refers new car models.

3 The synonyms of:
a make sure: ensure
b crash into: collide
c monitoring:
d needs (n): requirements

Page 23, Part Two, Exercise II

1 connecting / **2** leaks / **3** site / **4** failure / **5** noises / **6** vibration / **7** loose / **8** disassemble / **9** internal

Page 23, Part Two, Exercise III

Students' answers

Page 24, Part Two, Exercise IV

1 He asked where the meeting would take place.
2 The authorities asked why the plane had landed at a different airport.
3 The teacher asked who could draw this picture.
4 He asked who was going to be nominated vice president / He asked who the nominated vice president was going to be.

Page 24, Part Two, Exercise V

1 do
2 making
3 made
4 do

Page 24, Part Two, Exercise VI

1 Incorrect. The phone will be answered automatically..
2 Correct
3 Incorrect: My essay must be written today.
4 Incorrect: The medication should be stopped if it begins to produce side effects.

Page 24, Part Three, Exercise VII

Students' answers

7 Inside the System

lesson One

A Dialogue

Answers

1c / **2**a / **3** b (reconsider) / **4** b

B Listening

Answers

Answers vary

lesson Two

C Vocablary

Answers

1 built to weigh less than average: lightweight.
2 important, necessary: essential
3 not moving, or not intended to be moved: stationary
4 to distribute for a certain purpose: allocate
5 the part that controls the computer operations (Central Processing Unit): CPU
6 a cover that protects something: casing
7 the hardware that controls the memory of the computer (Random Access memory): RAM
8 the circuit board inside the computer: motherboard.

D Grammar

Answers

1 knew
2 were
3 didn't take
4 were
5 cooperated
6 had
7 were

lesson Three

E Preferences and comparisons

7

Answers

3 specific
4 General
5 specific

6 general
7 specific
8 specific

8

Answers

Answers vary

lesson Four

F Buying a product

Answers

Answers vary

lesson Five

G Reading

Answers

1 c HDMI port
2 g USB Port
3 e Power Cable Port
4 d Audio Socket
5 a Microphone
6 b Serial Port
7 f Ethernet

Questions

1 The Audio Socket
2 Power Cable Port
3 Answers vary
4 Answers vary.

Activity book Answer keys

Unit 7, page 25, exercise 1

1 d / **2** c / **3** e / **4** b / **5** a

Unit 7, page 25, exercise 2

A

1 would speed up
2 bought
3 had, would perform

B

1 If I got a laptop as a gift, I would download a lot of computer games.
2 If something went wrong with my computer, I would call a technician.
3 If your hard drive were/was damaged, all your data would be lost.

4 If her headphones didn't work, she couldn't listen to her favourite music.
5 If my computer's RAM were\was 4 Gb, it would be much faster than before.
6 Unlike you, If I didn't buy a laptop, I would choose a desktop.

Unit 7, page 26, exercise 3
1 Can you help me?
2 I think so too, because I mainly need the computer for Internet research and typing documents.
3 That's right. The tasks that a graphic designer does are much more complex.
4 For you, a 500 GB is sufficient. But for me, I need a 2TB SSD.
5 You need a lot of storage space**.**

Unit 7, page 26, exercise 4
1 The pieces are: processors, video cards, memory, hard drives, and connectivity.
2 - innovation
- significantly
- responsibility
- build up
3 Answers vary.

Unit 7, page 26, exercise 5
Answers vary.

8 Robots

lesson One

A Dialogue

Answers

1 A robot is a machine that can carry out difficult or routine tasks automatically.
2 Fuad suggested androids and Ahmed suggested robotic vacuum cleaner.
3 robots are so popular because they can do jobs more quickly than human can through their software.
4 Answers vary.

lesson Three

C Vocablary

3

Answers

a humanoid: **3** looking like a human in shape.
b Industrial: **1** related to manufacturing or building.
c Machine: **4** an appliance that is built to carry out a task.
d Rapidly: **2** quickly.
e Advance: **5** to move forward and become better.

4

Answers

1 An Android
2 popular
3 task
4 automatically

lesson Four

D Grammar

5

Answers

1 If he had bought a vacuum cleaner, he would have kept his house clean.
2 If we had had any equipment, we could have mended the machine.
3 If scientists hadn't created robotic bees, they wouldn't have known something about the planet Mars.
4 If car manufacturers hadn't used robots in their factories, car production would have been very slow and difficult.
5 If the hospital had had robots for sorting medicines, the process would have been efficient and much faster.

6

Answers

Answers vary.

lesson Five

E Reading

Answers

1 The first known robot was made around 400-350 BCE.
2 The first known robot was made out of wood and powered by steam.
3 The difference is that today's robots are much more sophisticated and complex.
4 The "Manta Droid" is shaped like manta ray and can swim through the sea and gather data about marine life and do underwater searches.
5 The tentacle of the "Octobot" was powered by chemical reactions in 3D printed chamber under its skin.

lesson Six

F Writing

Answers vary.

Activity book Answer keys

Unit 8, page 28, exercise 1

1 robotic
2 software
3 popular
4 humanoid
5 rapidly

Unit 8, page 28, exercise 2

1 could you please tell us a little bit about her before you introduce her to us?
2 Is Sally an android?
3 How does Sally move her arms and legs like we do?
4 What will Sally do?
5 So, can we meet her now?

Unit 8, page 29, exercise 3

1 had hold
2 had shared
3 would have broken
4 had used
5 had organized
6 would have been?

Unit 8, page 29, exercise 4

1 Because they are able to produce better work than humans, as they don't make mistakes and can work continuously faster and more precisely than humans.

2 They save companies money as they save time and don't waste expensive materials through human error.

3 Answers vary.

Unit 8, page 30, exercise 5

Answers vary.

Unit 8, page 30, exercise 6

Answers vary.

9 X-rays

lesson One

A Dialogue

Answers

1 Answers vary.
2 The x-ray beam passes through the soft tissue of the arm not the bone because the x-ray can go through dense things but not through hard ones.
3 The soft tissue shows up as black on the x-ray.

lesson Three

C Vocablary

Answers

Students' answers.

lesson Four

D Grammar

Answers

1 won't it?
2 should I?
3 doesn't it?
4 did she?
5 would they?
6 can they?
7 aren't they?
8 haven't they?
9 will they?
10 did they?

lesson Five

E Reading

1 The author's purpose in writing the text is to explain the importance of the x-rays since they are widely used in the medical setting and are a highly valuable diagnostic tool.
2 radiography x-rays
fluoroscopy x-rays
a CT scan
3 Answers vary.
4 Answers vary.
5 **a** detect
b symptom
c diagnostic
d angiogram

lesson Six

F Writing

Writing, students' answers

Activity book Answer keys

Unit 9, page 31-32, exercise 1

A

Answers vary

B

Across:

1 theory
2 light
3 wave length
4 solar

Down:

5 glow
6 travel
7 treatment
8 radiography

Unit 9, page 33, exercise 2

1 isn't it?
2 do they?
3 hasn't she?
4 did he?
5 can't they?
6 aren't they?

Unit 9, page 33, exercise 3

1 a Types of Machines detecting illnesses
b X-ray Machine is an Important Achievement
c Answers vary.

2 In the text they mention that broken bones or serious illnesses couldn't be detected, a lot of injuries and diseases would be undetected. Other problems could be: (answers vary)

3

4 - Achievement
- Advanced
- Invention

Unit 9, page 33, exercise 4

Answers vary

Review (Unit 7 – 9)

A

1 e
2 a
3 i
4 c
5 g
6 b
7 h
8 d
9 f
10 j

B

1 vital
2 medical
3 detect
4 wavelength
5 dense
6 bones
7 absorb

C

Answers vary

D

Answers vary

E

Answers vary

F

1 true
2 false; we do see them on a day to day basis.
3 false; computer manufacturers are responsible for protecting the environment.
4 true

G

1 he wouldn't work.
2 would choose
3 would still be
4 had

5 would love
6 would use
7 would have uploaded
8 were / was
9 would have consulted
10 would design

H

1 If I had bought a computer last year, I would have exchanged it for a laptop.
2 If Alia weren't /wasn't a nurse, she would like being a doctor more.
3 If I had learned how to use x-ray machine, I would have taken radiographs of peoples' body parts.
4 If the x-ray machine had broken down, we would have called the head radiographer immediately
5 If industries had needed to work more quickly, they would have invented Robots.
6 If Robots hadn't minimized the amount of repetitive jobs humans need to do, people wouldn't have started/wanted to do more interesting jobs. (there are other alternatives)
7 If industries had been concerned about the danger of working in certain environment, they would have created robots to do the jobs instead.

I

1 don't we?
2 aren't I?
3 don't you?
4 doesn't it?
5 isn't it?
6 does it?
7 shouldn't they?

Sample Test 3 Answer Key

Page 34, Part one, Exercise I

1 It was named "the tally stick"
2 It is the "abacus"
3 "Charles Babbage" is the father of computer".
4 The problem was that they were not programmable and not very accurate.
5 Suggested answers: banks, government offices, ... (answers vary)
6 Answers vary
7 Suggested title: The History of Computers" Answers vary.

Page 34, Part Two, Exercise II

1 Communication
2 essential
3 storing
4 quickly
5 daily
6 accurately
7 employees
8 personal

Page 35, Part Two, Exercise III

Answers vary

Page 35, Part Two, Exercise IV

1 If you go to the factory, you will see plenty of robots in action (first conditional)
2 My dad would have asked for help if he had known about computer hardware (third conditional)
3 If you bought a new laptop, I would teach you how to use it (second conditional).
4 If you had come to class today, you would have seen the humanoid robots (third conditional).
5 you would learn how to fix an internet connection problem if you took the course with me (second conditional)

Page 35, Part Two, Exercise V

1 didn't he?
2 aren't you?
3 are they?
4 has he?
5 shouldn't they?

Page 35, Part Two, Exercise VI

Students' answers

10 Automatic Control

Lesson One

A Dialogue

Answers

1 A shower head
2 He already has a shower head.
3 **a** False, automatically controlled shower head
b True
c True
d False, it is more expensive.

B Listening

Answers

1 have become very important.
2 electrical, mechanical and chemical matters.
3 automatic toaster, the washing machine and dryer, computers and robots.

Lesson Two

C Vocabulary

Answers

1 automatically / **2** manual / **3** control systems / **4** processes / **5** response

Lesson Three

D Grammar

Answers

1 everything / **2** Nobody, No one / **3** somewhere / **4** Anyone / **5** Nothing
6 nowhere, somewhere / **7** something / **8** something / **9** somewhere

Lesson Four

E Speaking

Answers

Students' answers

Lesson Five

F Reading

Answers

1

Ancient World: People used to organise a functional system based on water and level work to make jobs, like pulling up a wooden gate, easier.

17th century: Systems developed into designs to control the temperatures and the mechanics of mills and steam engines.

19th century: Control systems were modified to stabilise and steer ships and planes.
1930s and on: Control systems began to develop into automatic processors.

2 a iii the ancient world
b ii Automatic
c ii level work

Lesson Six

G Writing

Answers

Students' answers

Activity Book Answer Key

Unit 10, page 36, exercise 1

1 d / **2** c / **3** d / **4** a / **5** b

Unit 10, page 36, exercise 2

1 automatic
2 linear
3 operation, minimal
4 advances

Unit 10, page 37, exercise 3

Students' answers

Unit 10, page 37, exercise 4

A

1 All
2 everyone / everybody
3 Both
4 One
5 somewhere
6 everybody / everyone
7 anything
8 any

B Students' answers

Unit 10, page 38, exercise 5

1 Control systems have made human life easier.
2 measurement, comparison, computation and correction
3 Students' answers

Unit 10, page 38, exercise 6

Students' answers

11 Electrical Power Stations

Lesson One

A Dialogue

Answers

1 Thomas Edison is the inventor who built the first power stations; he is interested in power stations because he wants to know how the first power station, which he built in 1882, has developed.
2 types of energy sources have improved; power stations use gas, oil, coal and fuels; power stations produce electricity through heat, water, wind and the sun's heat.
3 Students' answers

Lesson Two

B Listening

Answers

1 water / **2** turbine / **3** generator / **4** cooling water / **5** condenser / **6** pump

Lesson Three

C Vocabulary

Answers

Students' answers

Lesson Four

D Grammar

Answers

1 d / **2** a / **3** b / **4** a / **5** c / **6** d / **7** b / **8** d / **9** c / **10** d

Lesson Five

E Reading

Answers

1 partner: colleague
steam: water vapour
supply: provide
overhead: above the level of the head
develop: progress
form: kind or type
2 Thomas Edison and Edward Johnson, in 1882
3 It was powered by a steam engine and provided electricity for the area around it through water pipes without digging up the ground.
4 Students' answers
5 **a** last: first / **b** destroyed: built / **c** took away: supplied / **d** consume / use up: generate

Lesson Six

F Writing

Answers

Students' answers

Activity Book Answer Key

Unit 11, page 39, exercise 1

1 hydraulic / **2** solar / **3** generator / **4** turbine / **5** electricity

Unit 11, pages 39-40, exercise 2

A 1 on; to / **2** for / **3** of / **4** before / **5** at / **6** in / **7** by / **8** across

B Our school took us on a trip to the city's power station. We went by bus, since the distance was too far to walk. There, we saw how electricity was produced and then distributed around the city. We went into one of the control rooms and observed the technicians at work. After we saw the control room, we then went to learn how the generators of the station worked. The turbines were moved by water or wind currents.

Unit 11, page 40, exercise 3

1 Students' answers

2 thermal: electrical power is generated by heat
water: electricity is produced through dams
sun: solar panels change sunlight into electricity
wind: wind turbines create electricity in wind power plants

3 It needs to be located in areas with strong, steady winds; to be strong enough to generate electricity by wind power plants

4 a thermal (energy derived from heat) ; b power station (place where electricity is generated); c solar (energy derived from the sun's rays); d dams (reservoirs that store water)

Unit 11, page 41, exercise 4

Students' answers

12 Latest Discoveries

Lesson One

A Dialogue

Answers

1 what they consider to be the most important discovery in history
2 vaccines; electricity; radio waves
3 very bad
4 Students' answers
5 Students' answers

B Listening

Answers

1 b / **2** a / **3** a / **4** c / **5** b

Lesson Two

C Vocabulary

Answers

1 mechanical / **2** commercially / **3** production / **4** converting
5 electrical / **6** integrate / **7** continuously

D Matching

Answers

a 7 / **b** 6 / **c** 5 / **d** 4 / **e** 2 / **f** 8 / **g** 1 / **h** 3

Lesson Three

E Grammar

5

Answers

1 F / **2** RO / **3** CS / **4** F / **5** CS / **6** RO / **7** CS / **8** F / **9** RO / **10** CS

6 and 7

Answers

6 and 7
Students' answers

Lesson Four

F Speaking

8 and 9

Answers

Students' answers

9

Answers

Students' answers

Lesson Five

G Reading

Answers

Students' answers

Lesson Six

H Writing

Answers

Students' answers

Activity Book Answer Key

Unit 12, page 42, exercise 1

1 painful / **2** invention / **3** safely / **4** extremely / **5** simultaneously
6 practical / **7** affordable / **8** recharge

Unit 12, page 42, exercise 2

Students' answers

Unit 12, page 43, exercise 3

A

a fragment / **b** fragment / **c** run-on / **d** run-on / **e** fragment
f fragment / **g** fragment / **h** fragment / **i** run-on / **j** run-on

B

Students' answers

Unit 12, page 43, exercise 4

advert 1 h / b / a / d / g
advert 2 c / f / e / i

Unit 12, page 44, exercise 5

1 Students' answers
2 a 4 / **b** 1 / **c** 5 / **d** 2 / **e** 3
3 It works without panels and draws power from the air. It's cheap.
4 Old solar systems use parts some of which are expensive, dangerous and heavy.
5 Students' answers

Unit 12, page 44, exercise 6

Students' answers

Review (units 10–12)

A

1 electricity
2 renewable
3 gathered
4 burned
5 processed

B

1 d / **2** a / **3** b / **4** c

C

Answers may vary

D

Answers may vary

E

1 other
2 Any
3 Both
4 Many
5 Several
6 Another
7 No one
8 Anybody

F

1 at
2 to
3 till / unti
4 into
5 in
6 into, before
7 at
8 in
9 in

G, H and I

1 F, Wool manufacturers are interested in self-cleaning clothing.
2 CS
3 RO, When coated with nanocrystals, fabrics become self-cleaning.
4 CS
5 F, Titanium dioxide can easily clean ink and coffee stains.

J
Answers may vary

Test 4 Answer Key

Page 45, Part one, Exercise I
1 a catseyes
b patent
c windscreen
2 Students' answers
3 a sitcom: situation and comedy
b brunch: breakfast and lunch
c camcorder: camera and recorder
4 Students' answers

Page 46, Part Two, Exercise II
1 Can you guess what it is?
2 I'll tell you.
3 you are consuming.
4 Where do you keep it?
5 How often do you check what it's recording?
6 I wonder what new inventions we'll have soon!

Page 46, Part Two, Exercise III
1 somebody
2 anything
3 nothing
4 anywhere
5 somewhere

Page 46, Part Two, Exercise IV
1 on; **2** between; **3** under; **4** with; **5** into; **6** at

Page 46, Part Two, Exercise V
Suggested answers
1 The advertisement is one of the best I've ever seen.
2 They produced the new kitcheware, put it in the market but they didn't advertise it.
3 When I read the newspaper, I knew about the accident.
4 If they buy the car, they will have an easier life.
5 Since I saw Mona last, she has gone to paris.

Page 46, Part Three, Exercise VI
Students' answers